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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,734	12/10/2003	Ilya Rushkin	339.7755USU	6685

7590 05/13/2005

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EXAMINER
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LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 05/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/732,734

Applicant(s)

RUSHKIN ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-29 and 31-36 is/are rejected.
- 7) ☐ Claim(s) 13 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. In REMARKS filed on March 3, 2005, applicants argue that obtaining good adhesion is a combination of chemistry and physical factors that depend on a number of factors, including the *specific polymers used* and that different adhesion mechanisms are involved in different environments with *different materials*. Applicants furthermore argue that because of the polarity and reactivity differences between polyamic acids (of Yamashiki et al'208) and polyamic acid diesters (of Matsuoka et al'682), the adhesion situation will be different and thus argue that which adhesion promoters will be effective is not obvious.

Based on applicants' such argument, previous 103(a) rejection on claims 1-12, 14, 17, 18-29, 31, and 34-36 over Yamashiki et al'208 in view of Matsuoka et al'682, previous 103(a) rejection on claims 15, 16, 32, and 33 over Yamashiki et al'208 in view of Matsuoka et al'682 and further in view of Mahdi et al'550, and previous 103(a) rejection on claims 16 and 33 over Yamashiki et al'208 in view of Matsuoka et al'682 and further in view of Nakamura et al'897 are hereby *withdrawn*.

2. In view of Terminal Disclaimer filed on March 3, 2005, previous double patenting rejection on claims 1-7, 14-24, and 31-36 over claims 1 and 3-13 of copending App.No.'097 is hereby withdrawn.

3. Due to newly cited prior arts, the following rejections are made non-final.

#### ***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-12, 14-29, and 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashiki et al (6,455,208 B1) in view of Ono et al (US 2005/0058780 A1).

Yamashiki teaches (col.1, lines 40-43) a colored polymer thin film composed of a polymer such as a polyimide, and in his Production Example 3, Yamashiki obtains a 20% polyamic acid solution which contains solvents of *γ*-butyrolactone and N-methyl-2-pyrrolidone by reacting compounds including 4,4'-diaminodiphenyl ether (DAE) and 4,4'-oxydiphthalic dianhydride (OPDA). The DAE is the present 4,4'-diaminodiphenyl ether of claims 3 and 5-7, and the OPDA is the present 3,3',4,4'-diphenyloxidetracarboxylic acid dianhydride of claims 3, 4 (structure XV), 6, and 7. Therefore, Yamashiki also inherently teaches present polyamic acid of the formula X of present claim 2.

Yamashiki does not explicitly teach the use of an adhesion promoter in his invention. Ono teaches (see [0054]) adding a coupling agent to a *polyamic acid* solution in order to improve adhesion between the polyamic acid or polyimide film and a substrate. Ono includes N-ethoxycarbonyl-3-aminopropyltrimethoxysilane, N-ethoxycarbonyl-3-aminopropyltriethoxysilane, N-benzyl-3-aminopropyltrimethoxysilane, N-benzyl-3-aminopropyltriethoxysilane, *N-phenyl-3-aminopropyltrimethoxysilane*, and N-phenyl-3-aminopropyltriethoxysilane as some of examples for such coupling agent, and all of these compounds meet the present formula I of claim 1 (since present R<sup>2</sup> can represent present IX in which R<sup>6</sup> is C<sub>2</sub> alkyl group, alkyl substituted phenyl, or phenyl). Based on Ono's teaching, it would have been obvious to one of ordinary skill in the art to add one of those coupling agents (such as *N-phenyl-3-aminopropyltrimethoxysilane*

which teaches present formula XVII of claim 16) into Yamashiki's polyamic solution so as to improve adhesion between the polyamic acid or polyimide film and the substrate as taught by Ono. Therefore, Yamashiki in view of Ono would render obvious present inventions of claims 1-7, 9-11, and 14-16 (since Yamashiki teaches present polyamic acid of claims 2-7, it is the Examiner's position that Yamashiki's polyamic acid would inherently be soluble in aqueous tetramethylammonium hydroxide and would also inherently be resistant to a solvent used in a photosensitive composition with which the polyimide precursor composition is to be used as presently recited in claim 1).

With respect to present claim 8, in his Production Example 3, Yamashiki uses total of 1 mol of diamine compounds (DAE, PDA and SiDA) and 0.9975 mols of OPDA (a dianhydride compound). Therefore, Yamashiki in view of Ono would render obvious present invention of claim 8.

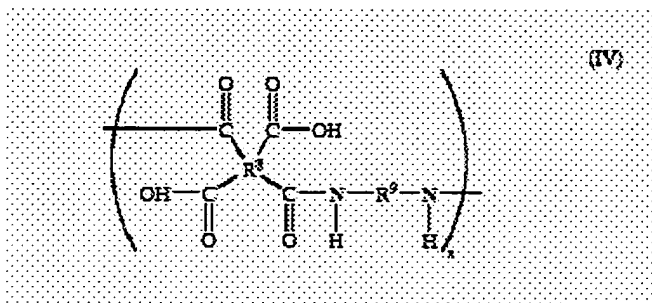
With respect to present claim 12, in Production Example 3, Yamashiki uses solvents of *γ*-butyrolactone and N-methyl-2-pyrrolidone. In col.15, lines 7-14, Yamashiki teaches that an organic solvent which does not dissolve the polyimide precursor by itself, for examples, ethanol, butanol, isopropanol, methyl cellosolve, ethyl cellosolve, or propyleneglycol monomethyl ether, can be mixed with the solvent which dissolves the polyimide precursor. Therefore, it would have been obvious to one of ordinary skill in the art to use propyleneglycol monomethyl ether (which has boiling point of 118-119°C) as the other solvent in Yamashiki's Production Example 3 with a reasonable expectation of obtaining a liquid crystal display exhibiting excellent display performance. Therefore, Yamashiki in view of Ono would render obvious present invention of claim 12.

With respect to present claim 17, Ono teaches (in [0054]) that the amount of the coupling agent is 0.1-30 wt%. The range overlaps with present range of claim 17 and thus would render the present range *prima facie* obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Therefore, Yamashiki in view of Ono would render obvious present invention of claim 17.

In col.6, lines 26-56, Yamashiki teaches that a color paste made of his polyamic solution is coated on the substrate and then heat-dried (preferably at 80-120°C) to form a polyimide precursor colored film, Then a positive photoresist is coated on the polyimide precursor colored film to form a photoresist coating. Then, a mask is placed on the photoresist coating, followed by irradiation with UV rays by using an exposure device. After exposure, the photoresist coating and the polyimide precursor colored film are simultaneously etched with a positive photoresist alkali developing solution. After etching, the unnecessary photoresist coating is separated. The polyimide precursor colored film is then converted to a polyimide colored film by heat treatment, preferably at 200-320°C. Therefore, Yamashiki in view of Ono would render obvious present inventions of claims 18-29 and 31-36.

6. Claims 1-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono et al (US 2005/0058780 A1).

Ono teaches (see [0037]) a liquid crystal alignment treating agent which contains a polyamic acid of the formula (IV) shown below:



This structure teaches present formula X of claim 2, and as one of examples for the tetracarboxylic dianhydride having  $R^8$ , Ono discloses (see [0042]) bis(3,4-dicarboxyphenyl)ether dianhydride (which is *present 3,3',4,4'-diphenyloxidetetracarboxylic acid dianhydride* having present structure XV in which Z is -O-). Also, as one of examples for the diamine having the bivalent organic group (for  $R^9$ ), Ono discloses (see [0046]) diaminodiphenylether (which is *present 4,4'-diaminodiphenyl ether* having present structure XVI in which W is -O-). Ono teaches  $\gamma$ -butyrolactone as one of two preferred solvents for his liquid crystal alignment treating agent (see [0052]). Furthermore, in [0054], Ono teaches adding a coupling agent to his polyamic acid solution in order to improve adhesion between the polyamic acid or polyimide film and a substrate. Ono includes N-ethoxycarbonyl-3-aminopropyltrimethoxysilane, N-ethoxycarbonyl-3-aminopropyltriethoxysilane, N-benzyl-3-aminopropyltrimethoxysilane, N-benzyl-3-aminopropyltriethoxysilane, *N-phenyl-3-aminopropyltrimethoxysilane*, and *N-phenyl-3-aminopropyltriethoxysilane* as some of examples for such coupling agent, and all of these compounds meet the present formula I of claim 1 (since present  $R^2$  can represent present IX in which  $R^6$  is  $C_2$  alkyl group, alkyl substituted phenyl, or phenyl). Based on Ono's teaching, it would have been obvious to one of ordinary skill in the art to add one of those coupling agents (such

as *N-phenyl-3-aminopropyltrimethoxysilane* which teaches present formula XVII of claim 16) into Ono's polyamic solution so as to improve adhesion between the polyamic acid or polyimide film and the substrate. Therefore, Ono's teaching would render obvious present inventions of claims 1-7 and 14-16 (since Ono teaches present polyamic acid of claims 2-7, it is the Examiner's position that Ono's polyamic acid would inherently be soluble in aqueous tetramethylammonium hydroxide and would also inherently be resistant to a solvent used in a photosensitive composition with which the polyimide precursor composition is to be used as presently recited in claim 1).

With respect to present claim 8, Ono teaches ([0041]) that the molar ratio of the tetracarboxylic acid derivative to the diamine is preferably from 0.8 to 1.2. The range overlaps with present range of claim 8 and thus would render the present range *prima facie* obvious. See In re Wertheim, supra. Therefore, Ono's teaching would render obvious present invention of claim 8.

In [0051], Ono teaches that the concentration of the polyamic acid is preferably from 1 to 20 wt.% (which means that the solvent constitutes 80-99 wt.%). Therefore, Ono's teaching would render obvious present inventions of claims 9-11.

In [0052], Ono teaches that preferably, 20-80 wt % of total amount of his solvents constitutes N-methyl-2-pyrrolidone and/or  $\gamma$ -butyrolactone, which means that rest of the amount (20-80 wt%) can include other solvents listed in [0052]. Based on this teaching, it would have been obvious to one of ordinary skill in the art to include N,N-dimethylacetamide (bp 164.5-166°C) as Ono's other solvent with a reasonable expectation of obtaining the liquid crystal alignment treating agent for vertical alignment,



which is excellent in printing properties. Therefore, Ono's teaching would render obvious present invention of claim 12.

With respect to present claim 17, Ono teaches ([0054]) that his coupling agent can be added in the amount of 0.1-30 wt %. Since this range overlaps with present range of claim 17, the prior art's range would render the present range *prima facie* obvious. See In re Wertheim, supra. Therefore, Ono's teaching would render obvious present invention of claim 17.

#### ***Allowable Subject Matter***

7. Claims 13 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited prior arts teaches or suggests present solvent of claims 13 and 30.

#### ***Response to Arguments***

8. Applicants' argument traversing the 103(a) rejections over Yamashiki et al'208 in view of Matsuoka et al'682 is now moot as those rejections are withdrawn.

The comparative data presented in Table 3 (as shown in REMARKS) was not considered at this time because it was not presented in an affidavit or a declaration (although the data seems to be showing unexpected superior results (in terms of stability of the composition) of present invention).

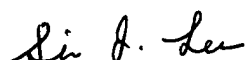
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333.

The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Lee  
May 10, 2005

  
**SIN LEE**  
**PRIMARY EXAMINER**